

REMARKS

In the Office Action mailed November 8, 2002, claims 1-9, 12, 14, and 22 were objected to for informalities; claims 7, 14, and 34 were rejected under 35 U.S.C. 112(2) as being indefinite; claims 1-8, 10-16, 26, and 28-35 were rejected under 35 USC 102(b) as being anticipated by Takeda et al. (U.S. Patent No. 5,228,100); claims 17-21, 25, and 27 were rejected under 35 U.S.C. 102(e) as being anticipated by Katsuyama et al. (U.S. Patent No. 6,035,061); claims 9 and 36 were rejected under 35 USC 103(a) as being unpatentable over Takeda et al. in view of Tsuchiya et al. (U.S. Patent No. 5,857,034); claim 22 was rejected under 35 U.S.C. 103 as being unpatentable over Katsuyama et al.; claim 23 was rejected under 35 U.S.C. as being unpatentable over Takeda in view of Katsuyama; and claim 24 was rejected under 35 U.S.C. 103 as being unpatentable over Takeda in view of Katsuyama and Tsuchiya.

In accordance with the foregoing, claims 2, 3, 6-17, 19, 22, 24, 25, 26, 27, 29, 33, 34, 35, and 36 have been amended. Claims 1, 23, and 28 have been cancelled. New claim 37 has been added. Claims 2-9, 16-22, 24-27, and 29-37 are pending and under consideration.

Care has been exercised to avoid the introduction of new matter.

A Version with Markings to Show Changes Made to the claims is included herewith.

The foregoing rejections of pending claims 2-9, 16-22, 24-27, and 29-36 are respectfully traversed.

Claims 2, 6, 24, 29, and 33 are amended into independent form. Claims 3-5 are amended to depend from claim 2; claims 7-9 are amended to depend from claim 6; and claims 34-36 are amended to depend from claim 33.

Claims 2, 3, 6, 7, 22, and 34 are amended, taking the Examiner's comments into consideration. Withdrawal of the objections to claims 2-8, and 22 and of the rejections under 35 U.S.C. 112(2) of claims 7 and 34 is respectfully requested.

Takeda et al. recognizes a physical structure of a sheet image such as line segments constituting the table image and characters inside and outside region of the table. Further, Takeda et al. discloses how the structure of a corner is recognized, by referring to Fig. 20A-20F. Takeda et al. distinguishes the patterns PT1-PT6 by the way discussed in the description of column 14, lines 36-68 and Fig. 21. That is, each region PT1-T3 is divided into 16 cells by horizontal lines H1, H2, and H4, and vertical lines V1, V2, and V3. Moreover, each pixel

density of the 16 regions is found. The corner patterns PT1-PT2 are distinguished from the distribution of the density. Takeda et al. finds the corner pattern which has been found as a corner. Further, if there are any blurs on the round corner region, Takeda et al. cannot distinguish the corner pattern in a case of existence of blur on the round corner.

Katsuyama et al. (U.S. Patent No. 6,035,061) finds ruled lines by the way discussed in column 10, 5857, column 11-14 and Fig. 11-13. That is, regions having a width composed of more pixel numbers than a fixed number and length of more than a fixed length are found and the regions are integrated as a line as shown in Fig. 11. Katsuyama et al. decides a rectangular as a title region by giving points to the rectangle. The point is added to the rectangle according to a ratio of the width of the rectangle to another rectangle of character strings region and a ratio of the length of the rectangle to the region of the character strings et al.

Tsuchiya et al. discusses extending a longitude ruled line and a lateral ruled line of a table having a round corner, and deleting the round corner.

The combination of Takeda and Katsuyama recognizes a physical structure of a sheet image such as line segments constituting the table image and characters inside and outside region of the table, finding ruled lines by regions having a width composed of more pixel numbers than a fixed number and length of more than a fixed length are found and the regions are integrated as a line.

The combination of Takeda, Katsuyama, and Tsuchiya recognizes a physical structure of a sheet image such as line segments constituting the table image and characters inside and outside region of the table, finding ruled lines by regions having a width composed of more pixel numbers than a fixed number and length of more than a fixed length are found and the regions are integrated as a line, and extending a longitude ruled line and a lateral ruled line of a table having a round corner, and deleting the round corner.

The present invention patentably distinguishes over the foregoing references relied upon, either alone or in combination, as explained.

Each of amended claims 2, 16, 26, and 29 of the present application extracts (using the recitation of claim 2 as an example) "an oblique element by extracting a first oblique element starting from a terminal of a longitudinal line, and a second oblique element commencing from a terminal of a lateral line within the lines found by the line extracting means", and that the round

corner region is decided with the relation of the two oblique lines.

Amended claim 3 recites "in a case that the first oblique element and the second oblique element overlap, the part as the potential match of the round corner".

Amended claim 30 recites similar features as amended claim 3.

Amended claim 4 recites deciding the round corner "in a case that the first oblique element and the second oblique element are within a distance fixed in advance and there is a pattern showing a line feature between them or contact or overlap each other".

Amended claim 31 recites similar features as amended claim 4.

Amended claim 5 recites "decides the round corner region in a case that any other oblique element does not exist near an identified oblique element and there is a pattern showing a line feature at the terminal of the identified oblique line".

Amended claim 32 recites similar features as amended claim 5.

Amended claim 6 recognizes the round corner region based on the first and second oblique line. Further, amended claim 6 recites "that the pixel density at a corner of a cell extracted by the means for extracting the cell changes in a fixed order". By these ways the corner can be decided even if there are any blurs on the round corner region.

Amended claim 33 recites similar features as amended claim 6.

Takeda et al. distinguishes the corner patterns PT1-PT2 from the distribution of the pixel density of the 16 regions shown in Fig. 21, when the corner has been recognized. Further, if there are any blurs on the round corner region, Takeda et al. cannot distinguish the corner pattern in a case of existence of blur on the round corner.

Amended claim 7 decides, in the case that a round corner part decided based on the pixel density change exists, another corner of the input image is decided as a round corner.

Amended claim 34 recites similar features as amended claim 7.

Amended claim 8 includes a feature, in addition to the feature of amended claim 6, that a round corner decided, in a case that a pattern of nth order function generated between the terminals of lines extracted by the means for extracting line matches the round corner part of the input image.

Amended claim 35 recites similar features as amended claim 8.

Amended claim 9 includes a feature of finding the character recognition region by neglecting the round corner part decided by the means for deciding round corner in the cells containing the round corner. That is amended claim 9 includes a feature of finding the character recognition region by neglecting the round corner part. Tsuchiya et al. expands a longitudinal rule line and a lateral rule line of table to enlarge the cell area. In contrast, amended claim 9 of the present invention makes character recognition highly accurate.

Amended claim 17 of the present invention includes a feature that finds the ruled line based on roughness of the potential match of the ruled line and any one of threshold of different plural thresholds corresponding to another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line. Amended claim 17 of the present invention finds the potential match of the rules lines, and further from the potential match of the ruled lines, true ruled lines are found by the means having the above mentioned feature. The claimed invention recited in claim 17 finds true lines considering the width of another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line width. With amended claim 17 of the present application, the identified potential match of the ruled line such as a ruled line shown in Fig. 24A of the present application is found not to be a true ruled line. Further, with the present invention, for the identified potential match of the ruled line contains crashed character strings such as shown in Fig. 25A of the present application, the crashed character strings is found not to be a true ruled line. In addition, when the identified potential match of the ruled line contains a blur such as shown in Fig. 26A of the present application, the blur is found to be a part of the true ruled line.

Amended claims 24, 25, and 27 include similar features to those of amended claim 17.

Amended claims 17, 24, 25, and 27 each recite (using the recitation of claim 17 as an example) "the means for finding the ruled line finds whether the identified potential match of the ruled line is a ruled line or not based on roughness of the potential match of the ruled line and any one of thresholds of different plural thresholds corresponding to another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line".

Amended claim 18 includes a feature that the pixel density finding process part, corresponding to the pixel density of the image pattern existing around the identified potential

match of the rule line, uses the first threshold in a case that the pixel density of the image pattern other than the identified potential match of ruled line is high, and uses the second threshold in a case that the pixel density of the image pattern other than the identified potential match of ruled line is low.

Amended claim 19 includes a feature that for the potential match of the ruled line is a longitudinal line, an image pattern of same length as the potential match of the ruled line existing right and left of the potential match of the ruled line within a fixed range is used as the image pattern existing around the potential match of the ruled pattern existing around the potential match of the ruled line; and for the potential match of the ruled line is a lateral line.

Amended claim 20 includes a feature that finds whether the potential match of the ruled line is ruled line or not base on the roughness found by the first threshold fixed in advance or the second threshold fixed in advance higher than the first threshold; and corresponding to the width of the image pattern existing around the identified potential match of the ruled line, uses the first threshold in a case that the width of the image pattern is wide, and uses the second threshold in a case that the width of the image pattern is narrow.

Amended claim 21 includes a feature that uses the potential match of the ruled line is extending to same direction as the identified potential match of ruled line and adjacent or connected to the identified potential match of ruled line as the image pattern existing around the identified potential match of ruled line.

Amended claim 22 includes a feature that decides that the width of the potential match of the ruled line is wide in a case that the width of potential match of ruled line is greater than n times of the width of the image pattern existing around the identified potential match of ruled line, and the width of potential match of the ruled line is narrow in a case that the width of potential match of ruled line is less than the $1/n$ times of the width of the image pattern existing around the identified potential match of ruled line.

Amended claim 22 finds the width ratio of a potential match of ruled region to another ruled line region which is on a line, and decides a threshold to decide a real ruled line or not according to the ratio.

Withdrawal of the foregoing rejections is respectfully requested.

New claim 37 is a memory medium storing a program for implementing the process of

the amended claim 6. New claim 37 includes the feature that the potential match of the round corner decides, in a case that the pixel density at a corner of a cell extracted by the process for extracting the cell changes in a fixed order, the part as the potential match of the round corner.

New claim 37 recites "deciding a round corner part by a fixed process for the corner of the cells extracted by processing for extracting the cell, wherein the round corner part decided, in a case that the pixel density at a corner of a cell extracted by the extracting the cell changes in a fixed order, the part as the potential match of the round corner".

Allowance of new claim 37 is respectfully requested.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.


Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: March 10, 2003

By: 
Gene M. Garner II
Registration No. 34,172

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please CANCEL claims 1, 10-15, 23, and 28 without prejudice or disclaimer.

Please AMEND the following claims:

2. (ONCE AMENDED) [The] A table image processing device [in claim 1]
comprising:
 - means for inputting an image comprising a sheet image including ruled lines;
 - means for extracting a line by extracting a longitudinal line and a lateral line from the input image;
 - means for finding a potential match of a round corner region by extracting an oblique line which commences from a terminal of a line found by the line extracting means, and finding a potential match of the round corner region based on the oblique line;
 - means for extracting a cell finding cells containing the potential match of the round corner found by the potential match of the round corner region finding means; and
 - means for deciding a round corner part deciding a round corner based on the cells found by the cell extracting means, wherein the means for finding the potential match of the round corner region extracts the oblique element by extracting a first oblique element starting from a terminal of a longitudinal line, and a second oblique element commencing from a terminal of a lateral line within the lines found by the line extracting means; wherein the round corned region is decided based upon the relationship of the two oblique lines.
3. (ONCE AMENDED) The table image processing device in claim 2, wherein the means finding a potential match of a round corner region decides, in a case that the first oblique element and the second oblique element overlap, the part as the potential match of the round corner.
4. (ONCE AMENDED) The table image processing device in claim 2, wherein the means for finding a potential match of a round corner region decides the part as the potential match of the round corner region in a case that the first oblique element and the second oblique element are within a distance fixed in advance and there is a pattern showing a line feature between them, or contact or overlap each other.

5. (ONCE AMENDED) The table image processing device in claim 2, wherein the means for finding potential match of the round corner region decides the part as the potential match of the round corner region in a case that any another oblique element does not exist near an identified oblique element and there is a pattern showing a line feature at the terminal of the identified oblique line.

6. (ONCE AMENDED) [The] A table image processing device [in claim 1] comprising:

means for inputting an image comprising sheet image including ruled lines;

means for extracting a line by extracting a longitudinal line and a lateral line from the input image;

means for finding a potential match of a round corner region by extracting an oblique line which commences from a terminal of a line found by the line extracting means, and finding a potential match of the round corner region based on the oblique line;

means for extracting a cell finding cells containing the potential match of the round corner found by the potential match of the round corner region finding means; and

means for deciding a round corner part deciding a round corner based on the cells found by the cell extracting means, wherein the means for deciding a round corner part decides the part as the round corner in a case that the pixel density at a corner of a cell extracted by the means for extracting the cell changes in a fixed order.

7. (ONCE AMENDED) The table image processing device in claim [1] 2, wherein the means for deciding a round corner part decides [the part as the round corner], in the case that a round corner part decided based on the pixel density change exists, another corner of the input image is decided as a round corner.

8. (ONCE AMENDED) The table image processing device in claim [1] 2, wherein the means for deciding a round corner decides, in case that a pattern of nth order function generated between the terminals of lines extracted by the means for extracting line matches the round corner [a] part of the input image, the part as the round corner.

9. (ONCE AMENDED) The table image processing device in claim [1] 6, further comprises [further]:

[means for inputting an image containing a sheet image containing ruled lines; and]
means for finding regions recognizing character finding the character recognition region by neglecting the round corner part decided by the means for deciding round corner in the cells containing the round corner.

16. (ONCE AMENDED) A memory medium storing a program for implementing in a computer a table image processing device, wherein the program comprises:

means for inputting an image comprising a sheet image including ruled lines;
extracting lines of longitudinal line and lateral line within [an] the input image;
finding a potential match of a round corner region by extracting an oblique line which commences at a terminal of a line extracted by the process for extracting lines, and finding a potential match of a round corner region by fixed process using the extracted oblique line;
finding cells containing the potential match of the round corner region found by the process for finding the potential match of round corner region;
deciding a round corner part by fixed process for the corner of cells extracted by processing for extracting cell, wherein the finding a potential match comprising extracting the oblique element by extracting a first oblique element starting a terminal of a longitudinal line, and a second oblique element commencing from a terminal of a lateral line within the lines found by the extracting; wherein the round corner region is decided based upon the relationship of the two oblique lines.

17. (ONCE AMENDED) A table image processing device comprising:
[including] means for processing finding a ruled line, wherein the means for processing finding the ruled line [comprises] comprising:

means for extracting a line extracting longitudinal lines and lateral lines from an input image;

means for deciding region recognizing character deciding region recognizing character;

means[, within potential matches of the ruled line of a longitudinal line and lateral line extracted from an input image,] for finding a ruled line by using the longitudinal lines and

the lateral lines extracted from the means for extracting lines as the potential match of the ruled line and for deciding whether the potential match of the ruled line is a ruled line or not [whether the identified potential match of the ruled line is a ruled line or not based on roughness of the potential match of the ruled line and any one of threshold of different plural thresholds corresponding to [an] another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line];

wherein the means for finding the ruled line finds whether the identified potential match of the ruled line is a ruled line or not based on roughness of the potential match of the ruled line and any one of thresholds of different plural thresholds corresponding to another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line.

18. (ONCE AMENDED) The table image processing device in claim 17, wherein the means for [processing] finding a ruled line comprises:

a pixel density finding [process] part finding whether the identified potential match of the ruled line is ruled line or not based on the roughness of the potential match of the ruled line by using a first threshold fixed in advance and a second threshold fixed in advance higher than the first threshold,

wherein the pixel density finding process part, corresponding to the pixel density of the image pattern existing around the identified potential match of the ruled line, uses the first threshold in a case that the pixel density of the image pattern other than the identified potential match of ruled line is high, and uses the second threshold in a case that the pixel density of the image pattern other than the identified potential match of ruled line is low.

19. (ONCE AMENDED) The table image processing device in claim 18 ,wherein the means for finding ruled line [finding means] comprising:[,]

when the potential match of the ruled line is a longitudinal line, an image pattern of same length as the potential match of the ruled line existing right and left side of the potential match of the ruled line within a fixed range is used as the image pattern existing around the potential match of the ruled line,

when the potential match of the ruled line is a lateral line, an image pattern of same length as the potential match of the ruled line existing up and under of the potential match of

the ruled line within in a fixed range is used as the image pattern existing around the identified potential match of the ruled line.

20. (ONCE AMENDED) The table image processing device in claim 17, wherein the means for finding ruled line [finding means comprises:] comprising ruled line width finding means [the ruled line width finding process means] finding whether the potential match of the ruled line is ruled line or not base on the roughness found by the first threshold fixed in advance or the second threshold fixed in advance higher than the first threshold;

wherein the ruled line width finding [process] means, corresponding to the width of the image pattern existing around the identified potential match of the ruled line, uses the first threshold in a case that the width of the image pattern is wide, and uses the second threshold in a case that the width of the image pattern is narrow.

21. (ONCE AMENDED) The table image processing device in claim 20, wherein the ruled line width finding [process] means uses the potential match of the ruled line extending to same direction as the identified potential match of ruled line and adjacent or connected to the identified potential match of ruled line as the image pattern existing around the identified potential match of ruled line.

22. (ONCE AMENDED) The table image processing device in claim 20, wherein the ruled line width finding [process] means decides that the width of the potential match of the ruled line [to be] is wide in a case that the width of potential match of ruled line is [grater] greater than the n times of the width of the image pattern existing around the identified potential match of ruled line, and the width of the potential match of the ruled line is [to be] narrow in a case that the width of potential match of ruled line is less than the 1/n times of the width of the image pattern existing around the identified potential match of ruled line.

24. (ONCE AMENDED) [The] A table image processing device [in claim 17] comprising:

means for inputting an image comprising a sheet image including ruled lines;

means for extracting a line extracting longitudinal lines and lateral lines from [an] the input image;

means for finding the potential match of round corners by extracting an oblique [element at a terminal of a line extracting by the means for extracting lines and finding a potential match of a round corner by using an oblique element the extracted oblique element; and

means for extracting cells containing the potential match of the round corner by using the means for finding potential match of the round corners;] line which commences from a terminal of a line found by the line extracting means, and finding a potential match of the round corner region based on the oblique line;

means for extracting a cell finding cells containing the potential match of the round corner found by the potential match of the round corner region finding means;

means for deciding round corners by processing deciding a round corner for corner of cells extracted by the means for extracting cells; [and]

means for deciding region recognizing character deciding region recognizing character finding the character recognition region by neglecting the round corner part decided by the means for deciding the round corner in the cells containing round corner;

wherein;

[the means for extracting a line containing the means for finding the potential match of the ruled line;]

the means for finding the ruled line [using the longitudinal lines and the lateral lines extracted from the means for extracting lines as the potential match of the ruled lines and] deciding whether [the] an identified potential match of the ruled line of a longitudinal line or a lateral line is a ruled line or not; and

[the means for finding potential match of the round corner region extracting the oblique element by using a line founded by the means for finding ruled lines; and

the means for extracting the cells extracting the cells based on the result founded by the means for finding ruled lines]

the means for finding ruled line finds whether the identified potential match of the ruled line is a ruled line or not based on roughness of the potential match of the ruled line and any one of the thresholds of different plural thresholds corresponding to another image pattern extracted from the input image pattern existing around the identified potential match of the ruled line;

the means for finding potential match of the round corner region extracts the

oblique element by using a line found by the means for finding ruled lines; and
the means for extracting a cell finds cells based on the result found by the means
for finding ruled lines.

25. (ONCE AMENDED) A memory medium storing program for implementing in a computer of a table image processing device, wherein the program comprises:
extracting a line to extract longitudinal lines and lateral lines from an input image;
extracting cells by using the longitudinal line and the lateral line;
deciding region recognizing character deciding region recognizing character; and
by using the longitudinal lines and the lateral lines extracted from the extracted lines as
the potential match of the ruled line, deciding whether the potential match of the ruled line is a
ruled line or not;

wherein it is found whether the identified potential match of ruled line is a ruled line or
not based on roughness of the identified potential match of the ruled line by using any one of
threshold of different plural thresholds corresponding to another image pattern extracted from
the input image pattern existing around the identified potential match of the ruled line

[within the potential match of the ruled line of longitudinal line and lateral line extracted from an input image, finding whether the identified potential match of ruled line is a ruled line or not based on roughness of the identified potential match of the ruled line by using any one of threshold of different plural thresholds corresponding to an image pattern extracted from the input image pattern existing around the identified potential match of the ruled line].

26. (ONCE AMENDED) A table image processing method using means for
inputting image for inputting a sheet image including ruled lines; means for
extracting a line extracting the longitudinal line and lateral line from an input
image; means for finding a potential match of a round corner region by
extracting an oblique line which commences from a terminal of a line found by
the line extracting means; and finding a potential match of the round corner
region based on the oblique line; means for a extracting cell finding cells
containing the potential match of the round corner found by the potential match
of the round corner region finding means and means for deciding a round corner
part deciding a round corner based on the cells found by the cell extracting

means comprising:

extracting a longitudinal line and lateral line out of an input image;

extracting an oblique line which commences from a terminal of a line found by the line extracting process, and finding a potential match of a round corner region based on the oblique line;

wherein from the potential match of the round corner region, extracting the oblique element by extracting a first oblique element starting a terminal of a longitudinal line, and a second oblique element commencing from a terminal of a lateral line within the lines found by the line extracting means, and

the round corner region is decided with the relation of the two oblique lines

[extracting a cell containing the potential match of the round corner region; and finding the round corner of the cell].

27. (ONCE AMENDED) A table image processing method for finding a ruled line by using means for extracting a line extracting longitudinal lines and lateral lines from an input image; means for extracting cells by using the longitudinal line and the lateral line; means for deciding region recognizing character deciding region recognizing character, said method comprising:

[within potential matches of a ruled line of a longitudinal line and a lateral line extracted from an input image,] finding whether an identified potential match of the ruled line is a ruled line or not based on a roughness of the potential match of the ruled line and one of a threshold of different plural thresholds corresponding to [an] another image pattern extracted from the input image pattern and existing around the identified potential match of the ruled line.

29. (ONCE AMENDED) [The] A table image processing device [in claim 28] comprising:

a unit inputting an image comprising a sheet image including ruled lines;

a unit extracting a line extracting the longitudinal line and lateral line from an input image;

a unit finding a potential match of a round corner region by extracting an oblique line which commences from a terminal of a line found by the line extracting unit, and finding a potential match of the round corner region based on the oblique line;

a unit extracting a cell finding cells containing the potential match of the round corner found by the potential match of the round corner region finding unit; and

a unit deciding a round corner part deciding a round corner based on the cells found by the cell extracting unit, wherein the unit finding the potential match of the round corner region extracts the oblique element by extracting a first oblique element starting a terminal of a longitudinal line, and a second oblique element commencing from a terminal of a lateral line within the lines found by the line extracting unit, wherein the round corner region is decided based upon the relationship between the two oblique lines.

30. (ONCE AMENDED) The table image processing device in claim 29, wherein the unit finding a potential match of a round corner region decides, in a case that the first oblique element and the second oblique element overlap, the part as the potential match of the round corner.

31. (ONCE AMENDED) The table image processing device in claim 29, wherein the unit for finding a potential match of a round corner region decides the part as the potential match of the round corner region in a case that the first oblique element and the second oblique element are within a distance fixed in advance and there is a pattern showing a line feature between them, or contact or overlap each other.

32. (ONCE AMENDED) The table image processing device in claim 29, wherein the unit for finding potential match of the round corner region decides the part as the potential match of the round corner region in a case that any another oblique element does not exist near an identified oblique element and there is a pattern showing a line feature at the terminal of the identified oblique line.

33. (ONCE AMENDED) [The] A table image processing device [in claim 28] comprising:

a unit inputting an image comprising a sheet image including ruled lines;

a unit extracting a line extracting the longitudinal line and lateral line from an input image;

a unit finding a potential match of a round corner region extracting an oblique line which

commences from a terminal of a line found by the line extracting unit, and finding a potential match of the round corner region based on the oblique line;

a unit extracting a cell finding cells containing the potential match of the round corner found by the potential match of the round corner region finding unit; and

a unit deciding a round corner part deciding a round corner based on the cells found by the cell extracting unit, wherein the unit for round corner part decides the part as the round corner in a case that the pixel density at a corner of a cell extracted by the unit extracting the cell changes in a fixed order.

34. (ONCE AMENDED) The table image processing device in claim [28] 29, wherein the unit for deciding a round corner part decides [the part as the round corner], in the case that a round corner part decided based on the pixel density change exists, another corner of the input image is decided as a round corner.

35. (ONCE AMENDED) The table image processing device in claim [28] 29, wherein the unit deciding a round corner decides, in case that a pattern of nth order function generated between the terminals of lines extracted by the unit for extracting line matches [a] the round corner part of the input image, the part as the round corner.

36. (ONCE AMENDED) The table image processing device in claim [28] 29, further [comprises further] comprising:

[a unit inputting an image containing a sheet image containing ruled lines; and]

a unit finding regions recognizing character finding the character recognition region by neglecting the round corner part decided by the unit deciding round corner in the cells containing the round corner.

Please ADD the following claims:

37. (NEW) A memory medium storing a program for implementing in a computer a table image processing device, said program when executed by the computer causes the

computer to execute the functions comprising:

- extracting a line by extracting a longitudinal line and a lateral line within an input image;

- finding a potential match of a round corner region by extracting an oblique line which commences from a terminal of a line found by the line extracting means, and finding a potential match of the round corner region by a fixed process using the oblique line;

- finding cells containing the potential match of the round corner found by the process for finding the potential match of the round corner region; and

- deciding a round corner part by a fixed process for the corner of the cells extracted by processing for extracting the cell, wherein the round corner part decided, in a case that the pixel density at a corner of a cell extracted by the extracting the cell changes in a fixed order, the part as the potential match of the round corner.